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10/693,484	10/23/2003	Mac Stevens	P156C1-US	2568

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EXAMINER	
GEBRESILASSIE, KIBROM K	
ART UNIT	PAPER NUMBER
2128	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/693,484	STEVENS ET AL.	
	Examiner	Art Unit	
	Kibrom K. Gebresilassie	2128	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 October 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2-62* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2-62* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *23 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This communication is responsive to Request for Continued Examination (RCE) filed on 10/31/2007.

2. Claims 2-62 are presented for examination.

3. Claims 55-62 have been added.

Continued Examination Under 37 CFR 1.114

4. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/31/2007 has been entered.

Response to Arguments

5. Applicants arguments, filed on 10/31/2007, have been considered, but they are not persuasive. Applicants are thanked for amendment/Remarks.

6. Applicant's argument relating to priority and specification are not persuasive.

Applicants argued:

> The claimed terms "computer-readable media" and "computer program product" are supported by both the present application and the parent application. These terms are well known in the computer field, and a person of ordinary skill in the field would instantly know that these terms include memory devices, magnetic disks, optically readable disks (e.g., compact disks and digital video disks), and the like. Moreover, the parent application states that embodiments of the invention "may be implemented in software operating on a general or special purpose computer" (paragraph 123 of the published version of the originally filed application serial no. 09/938,789). A person of ordinary skill in the computer field would instantly know that software cannot run on a computer unless the software

> is stored at least temporarily in a "computer-readable media" or "computer program product"; otherwise, as a person of ordinary skill in the field would know, the software would not be accessible to the computer and thus could not run on the computer. A person of ordinary skill in the field would thus instantly recognize that embodiments of the invention described in the specification can be stored on a computer readable media and run on a computer. Thus, the meaning of the terms "computer-readable media" and "computer program product" are well known, and their presence in the parent application is readily ascertainable from, the above quoted sentence from the parent application. Moreover, computer readable media and computer program product on which software can be stored are so pervasively known in the field that a person of ordinary skill in the field would have no trouble making and using such computer readable media and computer program product. Therefore, the parent application provides proper antecedent basis for the terms "computer-readable media" and "computer program product" and the terms are fully supported and enabled by the parent application.

In response, "computer readable medium" is not only covers what applicants mentioned in their arguments, but also covers non-tangible mediums such as signals or other form of propagation and transmission media, typewritten or handwritten text on paper, or other items. Because a "computer readable medium" could covers embodiments that are statutory and mediums that are non-statutory, it is proper to ensure a clear support in the specification so that the meaning of the medium in the claim may be ascertainable by reference to the specification. Therefore, it is proper to object the specification for failing to have an antecedent basis for the term "computer readable medium".

MPEP 608.01(o) states:

> "**The meaning of every term used in any of the claims should be apparent from the descriptive portion of the specification with clear disclosure as to its import**; and in mechanical cases, it should be identified in the descriptive portion of the specification by reference to the drawing, designating the part or parts therein to which the term applies. **A term used in the claims may be given a special meaning in the description.** **>See MPEP § 2111.01 and § 2173.05(a).<"

> "Note that **examiners should ensure that the terms and phrases used in claims presented late in prosecution of the application**

(including claims amended via an examiner's amendment) **find clear support or antecedent basis in the description so that the meaning of the terms in the claims may be ascertainable by reference to the description**, see 37 CFR 1.75(d)(1)."

Further,

MPEP states:

"**The later-filed application must be an application for a patent for an invention which is also disclosed in the prior application** (the parent or original nonprovisional application or provisional application). The disclosure of the invention in the parent application and in the later-filed application must be sufficient to comply with the requirements of the first paragraph of 35 U.S.C. 112. See *Transco Products, Inc. v. Performance Contracting, Inc.*, 38 F.3d 551, 32 USPQ2d 1077 (Fed. Cir. 1994)."

"the court held that for a nonprovisonal application to be afforded the priority date of the provisional application, "the specification of the provisional must contain a written description of the invention and the manner and process of making and using it, in such full, clear, concise, and exact terms,' 35 U.S.C. § 112 ¶1, to enable an ordinarily skilled artisan to practice the invention claimed in the nonprovisional application."

In this case, nowhere in the parent application described or specified the "computer readable medium", and therefore, **no priority is granted** for this matter.

7. Applicants are thanked for amending the claims to overcome claim objection, and the objection is withdrawn.

8. Regarding Double Patenting rejection, applicants indicated, "*In response to the double patenting rejection, Applicant **will file a terminal disclaimer after all other issues in the application are resolved***." Therefore, in this matter, the rejection is maintained.

9. Applicant's arguments relating to 101 rejections are not persuasive. As indicated in the previous Office Action mailed, none of the independent claims are **restricted to any field of application**, and therefore the claims are directed to all possible applications of the routing algorithm recited in the claims. In addition, note the new 101 rejection.

10. Applicant's arguments relating to art rejection are not persuasive.

a. Applicant's argued:

"Independent claim 2 recites "means for adjusting said initial array of nodes ... between at least a pair of obstacles." At the cited section, Vaughn describes routing a trace "around obstacles" (para 68, lines 15-18) but fails to make any mention of adjusting a node, much less adjusting an array of nodes as claimed. A trace is simply not the same thing as a node."

In response, Vaughn et al discloses:

planar surface. Other limitations of prior art routing schemes include non-uniform routing surface areas and inflexible node locations which generally remain fixed throughout the routing process. These limitations do not readily lend themselves to systematic analysis and thus impede the routing process. What is needed is a system and a method for routing the circuit paths that is not subject to such limitations. (paragraph [0008]),

Then

example, such a virtual node or target could be used to specify the junction of orthogonal paths which meet at a right angle. A virtual node or target may be temporary and it may be movable during routing analysis; other virtual ... (paragraph [0112]).

b. Applicant's argued:

"Claim 3 is also allowable because Vaughn fails to teach the recited feature of °°means for determining a number of paths that may pass between said pair of obstacles."

In response, Vaughn et al discloses:

[0157] It has been mentioned previously that the routing system **100** of the present disclosure combines the analysis performed by the analysis engine **110**, which includes the orthogonalization and homogenization and pattern recognition analysis of the routing path segments, followed by the routing zone analysis which allocates the circuit path segments and plans the routing for all of the path segments on a zone quanta basis. The zone quanta concept enables both the analysis and the actual routing to take place in a defined zone quanta of limited area, wherein the number of routing path segments to be processed and the number of obstacles to routing the path segments are reduced because of the

c. Applicant's argued:

"claim 4 is also allowable over Vaughn because Vaughn fails to teach the recited feature of" means ... determines a number of paths that may cross a line segment between said pair of obstacles."

In response, Vaughn et al discloses:

[0157] It has been mentioned previously that the routing system **100** of the present disclosure combines the analysis performed by the analysis engine **110**, which includes the orthogonalization and homogenization and pattern recognition analysis of the routing path segments, followed by the routing zone analysis which allocates the circuit path segments and plans the routing for all of the path segments on a zone quanta basis. The zone quanta concept enables both the analysis and the actual routing to take place in a defined zone quanta of limited area, wherein the number of routing path segments to be processed and the number of obstacles to routing the path segments are reduced because of the

d. Applicant's argued:

"claim 5 is also allowable over Vaughn because Vaughn fails to teach the recited feature wherein "adjusting means adjusts a number of nodes ... between said pair of obstacles."

In response, Vaughn et al discloses:

> [0182] Similarly, the routing for segment G-G' is subject to redirection as it is routed from the start node G along left vertical boundary **530** toward destination node G' located in zone quanta **12**. It is apparent that path segment G-G' is required to define additional nodes along the original heading in order to redirect the path around obstacles represented by path E-E' and D-D' within zone quanta **4**. These additional nodes locate points along the routing surface in which the path segment is jogged or changed in direction in order to bypass the obstacle. The routing path is then completed by

e. Applicant's argued:

"claim 6 is also allowable over Vaughn because Vaughn fails to teach the recited feature wherein adjusting means adjusts locations of said nodes located between said pair of obstacles."

In response, Vaughn et al discloses:

> example, such a virtual node or target could be used to specify the junction of orthogonal paths which meet at a right angle. A virtual node or target may be temporary and it may be movable during routing analysis; other virtual

(paragraph [0112]).

Further,

> [0182] Similarly, the routing for segment G-G' is subject to redirection as it is routed from the start node G along left vertical boundary **530** toward destination node G' located in zone quanta **12**. It is apparent that path segment G-G' is required to define additional nodes along the original heading in order to redirect the path around obstacles represented by path E-E' and D-D' within zone quanta **4**. These additional nodes locate points along the routing surface in which the path segment is jogged or changed in direction in order to bypass the obstacle. The routing path is then completed by

f. Applicant's argued:

"Claim 8 is also allowable over Vaughn because Vaughn fails to teach the recited feature "wherein said adjusting means adjusts a location of each of at least one of said nodes in accordance with a proximity of said node to an object."

In response, Vaughn et al discloses:

Thus, the routing engine **118** at block **424** determines which is closer, the boundary of the zone quanta or the next target node. If the target node is the closest defined point in the intended path, then the routing engine **118** fetches the target node at block **428** and then proceeds in block **430** to establish the heading of the routing segment that is being routed. On the other hand, if, in block **424**, it was determined that the boundary of the zone quanta is closer, then the flow proceeds along the path with the letter B to block **426** where the routing engine **118** then fetches the coordinates of the target which is at the path boundary junction. The flow (paragraph [0163]),

Then,

[0182] Similarly, the routing for segment G-G' is subject to redirection as it is routed from the start node G along left vertical boundary **530** toward destination node G' located in zone quanta **12**. It is apparent that path segment G-G' is required to define additional nodes along the original heading in order to redirect the path around obstacles represented by path E-E' and D-D' within zone quanta **4**. These additional nodes locate points along the routing surface in which the path segment is jogged or changed in direction in order to bypass the obstacle. The routing path is then completed by

g. Applicant's argued:

"Claim 9 is also allowable over Vaughn because Vaughn fails to teach the recited feature of "linking means for linking said adjusted initial array of nodes."

In response, Vaughn et al discloses:

[0182] Similarly, the routing for segment G-G' is subject to redirection as it is routed from the start node G along left vertical boundary **530** toward destination node G' located in zone quanta **12**. It is apparent that path segment G-G' is required to define additional nodes along the original heading in order to redirect the path around obstacles represented by path E-E' and D-D' within zone quanta **4**. These additional nodes locate points along the routing surface in which the path segment is jogged or changed in direction in order to bypass the obstacle. The routing path is then completed by

h. Applicant's argued:

"claim 10 is also allowable over Vaughn because Vaughn fails to teach the recited feature wherein "said linking means creates a link between each node in said array and nodes within a predetermined proximity of said each node."

In response, Vaughn et al discloses:

[0182] Similarly, the routing for segment G-G' is subject to redirection as it is routed from the start node G along left vertical boundary **530** toward destination node G' located in zone quanta **12**. It is apparent that path segment G-G' is required to define additional nodes along the original heading in order to redirect the path around obstacles represented by path E-E' and D-D' within zone quanta **4**. These additional nodes locate points along the routing surface in which the path segment is jogged or changed in direction in order to bypass the obstacle. The routing path is then completed by

i. Applicant's argued:

"claim 11 is also allowable over Vaughn because Vaughn fails to teach the recited feature wherein "said path traverses ones of said links."

In response, Vaughn et al discloses:

example, such a virtual node or target could be used t specify the junction of orthogonal paths which meet at right angle. A virtual node or target may be temporary an(paragraph [0112]).

j. Applicant's argued:

"In particular, claim 12 recites "creating ... partial paths," "determining a routing cost of each said partial path," and "discarding all of said partial paths that extend to one intermediate node except the partial path with the lowest routing cost."

Applicant's specification (paragraph [0086]) noted as follows:

> "The process then creates paths between the source node and each node to which the source node is linked. For each such node, the process estimates the length of a trace through that node between the source and destination nodes. This estimate is referred to as the routing cost in the description of FIG. 13. Thereafter, the process selects the node with the lowest routing cost, and creates paths between that node and each node to which the selected node is linked and estimates a routing cost for each such node."

In light of the specification, Vaughn et al discloses:

[0113] Referring now to **FIG. 5**, there is illustrated an example of the minimum spanning tree (MST) analysis of a simple point-to-point connection of three nodes together. These three terminal nodes, defined among the connections specified in the net list, would typically be included among all of the input data retrieved from the system database **106** by the analysis engine **110**. The three nodes to be connected together in this particular example are specified as node a **230**, a node **232** and a node **234**. The MST analysis is used to find the shortest sum of the possible paths that connect

Then,

to node **234**. The MST calculates the length of each segment and adds the corresponding segments together to evaluate which of the three combinations of segments has the shortest overall length. In this simple example shown in **FIG. 5**, it is easy to see by inspection that as long as the triangle represented by the three nodes **230**, **232** and **234** does not have equal sides, the path represented by the sum of the lengths of segments C1 and C2 provides the shortest overall length of a path that connects nodes **230**, **232** and **234** together. Therefore, the result of this MST analysis is to store the path segment information for segments C1 and C2 in association with the connection of these three particular nodes together.

k. Applicant's argued:

"claim 15 is also allowable over Vaughn because Vaughn fails to teach the recited feature wherein "said means for providing further comprises.., means for creating a link between said each node and nodes within a predetermined proximity of said each node."

In response, Vaughn et al discloses:

Thus, the routing engine **118** at block **424** determines which is closer, the boundary of the zone quanta or the next target node. If the target node is the closest defined point in the intended path, then the routing engine **118** fetches the target node at block **428** and then proceeds in block **430** to establish the heading of the routing segment that is being routed. On the other hand, if, in block **424**, it was determined that the boundary of the zone quanta is closer, then the flow proceeds along the path with the letter B to block **426** where the routing engine **118** then fetches the coordinates of the target which is at the path boundary junction. The flow (paragraph [0163]),

Then,

> [0182] Similarly, the routing for segment G-G' is subject to redirection as it is routed from the start node G along left vertical boundary 530 toward destination node G' located in zone quanta 12. It is apparent that path segment G-G' is required to define additional nodes along the original heading in order to redirect the path around obstacles represented by path E-E' and D-D' within zone quanta 4. These additional nodes locate points along the routing surface in which the path segment is jogged or changed in direction in order to bypass the obstacle. The routing path is then completed by

l. Applicant's argued:

"claim 17 is also allowable over Vaughn because Vaughn fails to teach the recited feature wherein "said means for providing further comprises.., means for creating a link to another node of said array that is within a predetermined distance."

In response, examiner would like to direct applicants to Figs. 5-7G and corresponding texts, which clearly shows the linking of nodes within a routing space.

m. Applicant's argued:

"In addition to the above reasons, claim 19 is also allowable for the reasons that Vaughn provides no teachings related to "means for applying a force to said node."

Applicants specification noted as follows:

"The process shown in FIG. 9 applies forces to each node based on nearby obstacles (e.g., obstacles and other nodes) 902, 904. The process then moves the nodes based on the applied forces 906."

In light of the specification, Vaughn et al discloses:

> [0182] Similarly, the routing for segment G-G' is subject to redirection as it is routed from the start node G along left vertical boundary **530** toward destination node G' located in zone quanta **12**. It is apparent that path segment G-G' is required to define additional nodes along the original heading in order to redirect the path around obstacles represented by path E-E' and D-D' within zone quanta 4. These additional nodes locate points along the routing surface in which the path segment is jogged or changed in direction in order to bypass the obstacle. The routing path is then completed by

11. Applicants have been added new claims. Examiner would like to thank applicants for indicating the portion of the specification, which dictate the structure relied on for proper interpretation, and also to verify and ascertain the metes and bounds of the new claims.

Priority

12. The later-filed application must be an application for a patent for an invention which is also disclosed in the prior application (the parent or original nonprovisional application or provisional application). The disclosure of the invention in the parent application and in the later-filed application must be sufficient to comply with the requirements of the first paragraph of 35 U.S.C. 112. See *Transco Products, Inc. v. Performance Contracting, Inc.*, 38 F.3d 551, 32 USPQ2d 1077 (Fed. Cir. 1994).

The disclosure of the prior-filed application, Application No. 09/938, 789, fails to provide adequate support or enablement in the manner provided by the first paragraph of 35 U.S.C. 112 for one or more claims of this application. For example, the claimed invention recites a "computer-readable media". There is no any support in the prior application and therefore **no priority is granted** for the later-filed application for this matter.

Specification

13. The disclosure is objected to because of the following informalities:

n. Applicants specification noted as follows:

> [00118] It should also be apparent that the embodiments and applications of the invention described herein can be used alone or in conjunction with other routing methods. As just one example, once traces have been routed in accordance with the instant invention, the traces may be adjusted or optimized as disclosed in **U.S. patent application serial no._____**, with an attorney docket number P157-US, entitled "Process And Apparatus For Adjusting Traces," and filed concurrently with the instant application, which application is incorporated by reference herein in its entirety.

Applicants should provide the Serial No. of the copending application.

Appropriate correction is required.

14. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: the claimed invention recites a "computer-readable media" and the specification does not provide proper antecedent basis for the claimed subject matter.

Claim Objections

15. Claims objected to because of the following informalities:

o. Claim 2 recites "adjusting means for adjusting" should be replaces with "means for adjusting".

p. Clam 3 recites "determining means for determining" should be replaced with "means for determining".

q. The same objection will apply for claims 4-10. Appropriate correction is required.

Double Patenting

16. Claim 18 is objected to under 37 CFR 1.75 as being a substantial duplicate of claim 1. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

17. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

18. Claims 2, 12, 18, 22, 32, and 39 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 2, 12, and 16 of U.S. Patent No. 6,678,876. Although the conflicting claims are not identical, they are not patentably distinct from each other because all claims are directed to creating an initial array of nodes within a routing space, adjusting initial array of nodes, and selecting a path through adjusted array of nodes. Claims 2, 12, and 16 of Patent No. 6,678,876 contain every element of claims 2, 12, and 18 of the instant application and anticipate the claims of the

instant application. Claims of the instant application are not patently distinct from the earlier patent claims and as such are unpatentable over obvious-type double patenting. A later application claim is not patentably distinct from an earlier claim if the later claim is anticipated by the earlier claim.

Claim Rejections - 35 USC § 112

19. Claims rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

For example,

r. Claims 13 and 14 recite "means for iteratively creating a plurality of partial paths creates a plurality of partial paths". It is unclear what the recited limitation mean.

Claim Rejections - 35 USC § 101

20. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

21. Claims 2-62 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

For example,

a. The independent claims are directed to non-statutory subject matter because the claimed invention would impermissibly cover every

substantial practical application of, and thereby preempt all use of, an abstract idea, natural phenomenon, or law of nature. None of the independent claims are restricted to any field of application, and therefore the claims are directed to all possible applications of the routing algorithm recited in the claims.

b. Claims 22, 32, and 39 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The claims recite "a computer program product" and "computer readable medium". There is no mention of the medium in the specification, and the context the medium was used in the claim would fairly suggest to one of ordinary skill in the art as signals or other form of propagation and transmission media, typewritten or handwritten text on paper, or other items failing to be an appropriate manufacture under 35 USC 101.

c. Claims 2-21 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The claims do not seem to require any hardware to perform their functions. As such, the claims appear to be a ***system of software per se*** and are therefore non-statutory. A claim that recites a piece of software alone without any link to a hardware component is directed to non-statutory subject matter since there is no relationship between the computer software and hardware components which permits the functionality of the software to be realized.

Claim Rejections - 35 USC § 102

22. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

23. Claims 2-62 are rejected under 35 U.S.C. 102(e) as being anticipated by US Publication No. US 2001/0038612 A1 issued to Vaughn et al.

Claim 2:

Vaughn discloses a system for finding a path for electrically conductive traces to be routed within a routing space (**See: Title)** comprising:

means for creating an initial array of nodes within the routing space (**See: [0009]; [0067]**);

adjusting means for adjusting said initial array of nodes, including adjusting node between at least a pair of obstacles in said routing space (**See: [0068] lines 15-18**); and

means for selecting a path through said adjusted array of nodes (**See: [0068] lines 18-21; [00112]**).

Claim 3:

Vaughn discloses the system of claim 2, wherein said adjusting means comprises: determining means for determining a number of paths that may

pass between said pair of obstacles and means for adjusting a number of nodes between said pair of obstacles to be equal to said number of paths (**See:[0157] lines 8-13**).

Claim 4:

Vaughn discloses the system of claim 3, wherein said determining means determines a number of paths that may cross a line segment between said pair of obstacles (**See: [0157]**).

Claim 5:

Vaughn discloses the system of claim 2, wherein said adjusting means adjusts a number of nodes along a line segment between said pair of obstacles to be equal to a number of permissible paths between said pair of obstacles (**See: [0109], [0182]**).

Claim 6:

Vaughn discloses the system of claim 2, wherein said adjusting means adjusts locations of said nodes located between said pair of obstacles (**See: [0112], [0182]**).

Claim 7 :

Vaughn discloses the system of claim 6, wherein said adjusting means further positions said nodes located between said pair of obstacles to correspond to permissible locations of paths between said obstacles (**See: [0182] lines 4-10**).

Claim 8 :

Vaughn discloses the system of claim 2, wherein said adjusting means adjusts a location of each of at least one of said nodes in accordance with a proximity of said node to an object in said routing space (**See: [0067] lines 9-13, [0163],[0182]**).

Claim 9 :

Vaughn discloses the system of claim 2 further comprising linking means for linking said adjusted initial array of nodes (**See: [0162] lines 1-6, [0182]**).

Claim 10 :

Vaughn discloses the system of claim 9, wherein said linking means creates a link between each node in said array and nodes within a predetermined proximity of said each node without crossing any of said links (**See: [0104] lines 5-6, [0182]**).

Claim 11 :

Vaughn discloses the system of claim 10, wherein said path traverses ones of said links (**See: [0163] lines 10-15**).

Claim 12 :

Vaughn discloses a system for finding a path for electrically conductive traces to be routed within a routing space (**See: Title)** comprising:

providing means for providing an array of linked nodes within said routing space, said array including a source node, a destination node, and a plurality of intermediate nodes (such as...***start node, interim node and target node....*;See; [0184]**); and

determining means for determining a path from said source node to said destination node through said linked nodes (**See: Fig. 14G**), wherein said determining means comprises:

creating means for iteratively creating a plurality of partial path, each said partial path extending to an intermediate node in said array (**See: [0180]; Fig. 6**);

means for determining a routing cost of each said partial path (such as ...***selects the shortest path...;*****See: [0104]**); and

means for discarding all of said partial paths that extend to one intermediate node except the partial path with the lowest routing cost if more than one partial path extends to said one intermediate node (such as ...***the minimum spanning tree analysis...*****; See: [0113], [0114], Fig. 5 and Fig. 6**).

Claim 13 :

Vaughn discloses the system of claim 12, wherein said means for iteratively creating a plurality of partial paths creates a plurality of partial paths by creating initial paths from said source node to first nodes linked to said source node (**See: Fig. 14G**).

Claim 14 :

Vaughn discloses the system of claim 13, wherein said means for iteratively creating a plurality of partial paths means creates a plurality of partial paths (such as ***interim nodes;*** **Fig. 14F and 14G**) further by extending said initial paths from said first nodes to nodes linked to said first nodes (**See: Fig. 15A**).

Claim 15 :

Vaughn discloses the system of claim 12, wherein said means for providing further comprises means, for each node in said array, for creating a link between said each node and nodes within a predetermined proximity of said each node without crossing any of said links (**See: [0104] lines 5-6**).

Claim 16 :

Vaughn discloses the system of claim 12, wherein said means for providing further comprises means, for each node in said array, for creating shortest links between said each node and nodes within a predetermined proximity of said each node without crossing any of said links (**See: [0104] lines 1-9**).

Claim 17 :

Vaughn discloses the system of claim 12, wherein said means for providing further comprises:

means for selecting one of said nodes of said array; means for creating a link to another node of said array that is within a predetermined distance of said selected node; and means for deleting, if said created link crosses another link, a longest of said crossed links (**See: [0113]**).

Claim 18 :

Vaughn discloses a system comprising:

means for creating means for creating an initial array of nodes within a routing space (**[0009] lines 6-9**);

means for adjusting said initial array of nodes, including adjusting a location of each of at least one of said nodes in accordance with a proximity of said node to an object in said routing space (such as ...***routing the segments around obstacles...;*****See: [0068] lines 15-18**); and

means for selecting a path through said adjusted array of nodes (such as ...***storing the path routing...*** **See: [0068] lines 18-21**).

Claim 19 :

Vaughn discloses the system of claim 18, wherein said means for adjusting further comprises: means for applying a force to said node, wherein a magnitude of said force corresponds to said proximity of said node to an obstacle, and means for moving said node in accordance with said force (such as ...***bypass obstacles*****...See: [0170], [0182]; Fig. 13 C and corresponding texts**).

Claim 20 :

Vaughn discloses the system of claim 18, wherein said adjusting means adjusts a location of each of at least one of said nodes in accordance with a proximity of said node to a plurality of said objects in said routing space (such as ...***routing the segments around obstacles...;*****See: [0068] lines 15-18**).

Claim 21 :

Vaughn discloses the system of claim 20, wherein said means for adjusting a location of each of at least one of said nodes further comprises: means for applying a plurality of forces to said node, wherein a magnitude of each of said plurality of corresponds to said proximity of said node to one of said

plurality of obstacles; and means for moving said node in accordance with a sum of said plurality of forces (such as ***...bypass obstacles...*See: [0170] and Fig. 13 C**).

Claim 38 :

Vaughn discloses the media of claim 32, wherein said step of instruction for determining a routing cost of each said partial path comprises instruction for estimating a length of a path from said source node to said destination node through the intermediate node to which said partial path extends (such as ***...minimum length path...;* See: [0104] lines 12-17**).

As per Claim 43:

Vaughn discloses the system claim 2, wherein said path corresponds to a path for a trace or wiring in an electronic system (**See: Title**).

As per Claim 44:

Vaughn discloses the system of claim 2, wherein said path is stored within said system (**See: [0064]**).

As per Claim 55:

Vaughn discloses the system of claim 2, wherein said means for creating an initial array of nodes created the initial array of nodes in a honeycombed pattern (**See:** .

As per Claim 56:

Vaughn discloses the system of claim 2, wherein said means for creating an initial array of nodes creates the initial array of nodes wherein a random location of at least one node is generated .

As per claims 22-37, 39-42, 45-54, and 57-62:

The limitations of claims 22-37, 39-42, 45-54, 57-62 have already been discussed in the rejection of claims 2-21, 43-44, 55, and 56. The instant claims are functionally equivalent to the above rejected claims and are therefore rejected under the same rationale.

Conclusion

24. All claims are rejected.

25. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

s. US Patent No. 7, 065, 729 issued to Chapman et al teaches:

> "A computer-implemented approach for routing an integrated circuit using non-orthogonal routing is accomplished during two phases: a global routing phase and a detailed routing phase. During global routing, routing indicators, in the form of hint polygons, are added to the integrated circuit layout and strategy lists, that include bias directions and straying limits, are generated for the new wires to be added. The hint polygons and strategy lists are used during detailed routing to aid in placing the new wires. If obstacle conflicts or insufficient space problems prevent the detailed routing of a new wire, then an obstacle resolution portion of global routing is used to resolve the obstacle conflict and/or provide additional space in the integrated circuit layout to route the new wires. Obstacle resolution includes, without limitation, moving or changing layout geometry, changing or add hint polygons, changing the routing strategy by changing the bias direction and/or adjusting straying limits, inserting one or more layer changes, instructing the detailed router to backup and insert a bend, ripping-up and rerouting one or more wires, or routing the wire from the destination connection point. Also, a tight routing approach may be employed to accommodate constructing routing paths in tight layout areas. Object specific design rule checks are employed to increase routing flexibility optimize routing performance. "On-the-fly" design rule checks are performed on portions of routing paths as the routing paths are being constructed."

Examiner Remarks

26. Examiner's Note: **Examiner has cited particular columns and line numbers in the references applied to the claims above for the convenience of the applicant.** Although the specified citations are representative of the teachings of the art and are applied to specific limitations within the individual claim, other passages and figures may apply as well. **It is respectfully requested from the applicant in preparing responses, to fully consider the references in their entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the Examiner.**

Examiner Request

27. **In the case of amending the claimed invention, Applicant is respectfully requested to indicate the portion(s) of the specification which dictate(s) the structure relied on** for proper interpretation and also to verify and ascertain the metes and bounds of the claimed invention.

MPEP states:

"...with respect to newly added or amended claims, applicant should show support in the original disclosure for the new or amended claims. See MPEP § 714.02 and § 2163.06."

Communications

28. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kibrom K. Gebresilassie whose telephone number is 571-272-8571. The examiner can normally be reached on 8:00 am - 4:30 pm Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamini S. Shah can be reached on 571-272-2279. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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